

DISCUSSION OF THE AMENDMENT

Claim 18 has been amended by lowering the maximum amount of coagulate to 0.1 wt %, as supported in the specification at page 26, lines 18-28. Claim 24 has been amended by deleting superfluous language. Remaining amendments change from plural to singular format, with the understanding that “a” when referring to a component is inclusive of “at least one.” Claim 35 has been amended by correcting the “-10°C” temperature for notched impact strength.

No new matter is believed to have been added by the above amendment. Claims 18 and 20-38 remain pending in the application.

REMARKS

Due to the length of the specification herein, Applicants will cite to the paragraph number of the published patent application (PG Pub) of the present application, i.e., US 2006/0052515, when discussing the application description, both in this section and in the Remarks section, *infra*, rather than to page and line of the specification as filed.

The rejection under 35 USC 103(a) of:

Claims 18, 20-23, 25-31 and 34-38 as unpatentable over US 4,180,529 (Hofmann) in view of US 4,173,596 (De Witt);

Claims 18, 20-21, 25-31 and 34-38 as unpatentable over Hofmann in view of US 4,914,142 (Takarabe et al);

Claims 18, 20-21, 24-31 and 34-38 as unpatentable over Hofmann in view of US 4,371,677 (Morningstar et al);

Claim 32 as unpatentable over Hofmann in view of De Witt or Takarabe et al or Morningstar et al, each further in view of US 4,542,179 (Falk et al);

Claim 33 as unpatentable over Hofmann in view of De Witt or Takarabe et al or Morningstar et al, each further in view of US 5,777,034 (Shah et al),

are all respectfully traversed.

The present claimed process, as recited in above-amended Claim 18, is characterized by, *inter alia*, preparing an aqueous polymer dispersion of a core-shell polymer having, in effect, a polymer solids content of greater than 50% by weight, and a coagulate content less than 0.1% by weight.

The specification herein contains comparative data between the presently-claimed invention and the prior art. Core-shell particles labeled as B1 and B2 are according to the present invention. Core-shell particles labeled as VB1 through VB7 are according to the prior art. The data is described in the specification beginning at paragraph [0178]. As

described in the specification for Comparative Examples VB1 and VB2, any attempt to achieve a solids content higher than 48% by weight for the resultant dispersion resulted in observation of an increased amount of coagulate (>1% by weight of the dispersion). See also the data in Tables 1 and 2, wherein the respective monomer contents for the inventive core-shell particles and the comparative core-shell particles are similar. For prior art examples VB3 through VB7, see the data in Table 7 where, in each case, **both** a solids content of over 50%, **and** a coagulate content of 0.1% or less, were not obtained.

The prior art compared, as discussed above, is closer to the presently-claimed invention than Hofmann or any of the other prior art applied herein.

Hofmann discloses a multi-layered graft acrylic polymer that is comprised of an elastomeric core formed of cross-linked acrylate, a non-elastomeric, relatively hard second layer of a cross-linked methacrylate polymer, wherein the methacrylate monomer may be copolymerized with optionally another monoethylenically unsaturated monomer, a third layer of elastomeric polymerized alkyl acrylate with optionally another monoethylenically unsaturated monomer, and a fourth layer non-elastomeric, relatively hard alkyl methacrylate polymer, wherein the methacrylate monomer is optionally copolymerized with another monoethylenically unsaturated monomer.

The Examiner acknowledges that Hofmann does not disclose various limitations of the claims, i.e., an emulsion of a seed latex whose particle radius is 3.0 to 20 nm as the initial charge; the total weight of components A-J, based on the total weight of the aqueous dispersion; the properties of the molded product, and the amount of coagulate in the dispersion.

With regard to the last acknowledgement, Example 8, which the Examiner particularly relies on, is disclosed as needing a coagulation step (column 10, lines 6-13). It

must be assumed therefore that the coagulate content in Example 8 is significantly greater than the presently-recited maximum of 0.1% by weight.

Neither DeWitt, Takarabe et al, nor Morningside et al remedy the deficiencies of Hofmann.

DeWitt discloses that the impact resistance of rigid polymeric resins is enhanced by incorporation of the polymeric toughening agent described therein in various polymer matrixes. However, as with Hofmann, there is no description of a core/shell structured polymer product that is produced from a dispersion that has a coagulate content of any amount.

In response to Applicants' argument that both Hofmann and DeWitt are silent with regard to coagulate content (notwithstanding the above argument that Example 8 of Hofmann, which the Examiner relies on, necessarily has a coagulate content outside the terms of the above-amended claims), the Examiner finds that "given that the aqueous dispersion of [Hofmann] in view of [DeWitt] are prepared by a substantially similar process, it is the Examiner's position that a relatively small amount of coagulum is intrinsically present in the aqueous dispersion of [Hofmann] in view [DeWitt], absent evidence of unexpected results."

In reply, if it is the Examiner's holding that combining Hofmann and DeWitt necessarily results in a coagulate content within the terms of the present claims, there is no basis for this holding. The processes of the prior art described above with regard to the comparative data in the specification are also "substantially similar" processes but could not achieve both the presently-recited solids content and coagulate content. Indeed, the applied prior art does not disclose how to achieve both at the same time.

Takarabe et al does not overcome the deficiencies of Hofmann, and, in fact, is believed not to be germane to either the process disclosed in Hofmann or the present process. Nowhere does Takarabe et al disclose or suggest a process of forming a core-shell, multilayer

(meth)acrylate polymer, wherein the core stage of the multilayer polymer is formed in the presence of a seed latex. Rather, Takarabe et al discloses a method of producing an emulsion polymer by **adding a polymerizable unsaturated monomer to an emulsion polymer** comprised of a high mol wt. compound that does not contain a polyfunctional cross-linkable monomer or a chain transfer agent and which has a  $M_w$  mol wt. of 20,000 to 2,000,000 as a seed polymer. The monomer that is employed for polymerization is selected from a broad group of types (columns 4-5). The predominant polymerizable monomer disclosed in the examples is styrene. There is no disclosure or suggestion of forming a multi-layered polymer dispersion, from which an impact modifier is derived, that contains a low amount of coagulate.

In response to the above arguments, the Examiner states that Takarabe et al "is used only for its teaching that polymerizing a monomer in the presence of film forming aids such as ethylene glycol ... would result in the formation of a dispersion with low content of coagulum. Furthermore, both [Hofmann] and [Takarabe et al] deal with emulsion polymerization process [sic] to prepare an aqueous dispersion."

In reply, the Examiner has no basis for relating the presence of film forming aids to the result of a low coagulum content. Moreover, whether or not Hofmann and Takarabe et al are drawn to emulsion polymerization processes to prepare an aqueous dispersion is irrelevant to the issue of whether one of ordinary skill in the art would combine their disclosures.

Morningstar et al discloses a process for producing vinyl copolymer dispersions. In the process a vinyl- or vinylidene halide is copolymerized with another comonomer in an aqueous medium containing an emulsifier and a long chain alcohol and initiated by a radical initiator. The copolymer product can be prepared by the intermittent polymerization of monomers. The copolymer in the state of a plastisol can be fused at low temperatures or in a

shorter time than the normal grade, conventional vinyl copolymers. In order to prepare the vinyl copolymer, an emulsification system is employed in which an emulsifier is present in the aqueous medium, such as a salt of a long chain fatty acid, and a long straight chain saturated alcohol. The alcohol is said to increase the colloidal stability of the polymerization system and to reduce the amount of coagulum in the copolymer latex. Upon isolation of the product polymer, it is combined with a plasticizer to form a plastisol. There is no disclosure or suggestion of a method of preparing a core/shell (meth)acrylate copolymer which is useful as an impact modifier that is produced under the desirable condition of having a low coagulate content.

In response to the above argument, the Examiner states that Morningstar et al "is only used for its teaching that adding long straight chain saturated alcohol, containing from 8 to 24 carbon atoms, in the emulsifier system increases colloidal stability of the polymerization and reduces the amount of coagulum in copolymer latex."

In reply, while the addition of the alcohol to the emulsifier system in Morningstar et al may reduce the amount of coagulum in the copolymer latex in Morningstar et al, it is only with the present disclosure as a guide that one of ordinary skill in the art would add it to a system in which a core-shell polymer is being prepared. It could not be predicted what effect the alcohol of Morningstar et al would have on subsequent polymerizations to form the shells of Hofmann once the first stage or seed is formed.

Falk et al discloses a thermoplastic composition that is comprised of a blend acrylic sequential graft copolymer which has a core/shell structure and a SAN copolymer. The reference in column 4 describes a method of preparing core/shell compositions under emulsion polymerization conditions. Nothing is disclosed of the preparation of a core/shell copolymer which should have a low coagulate content.

Shah et al is drawn to methacrylate resin blends, disclosed to have improved solvent craze resistance (Abstract).

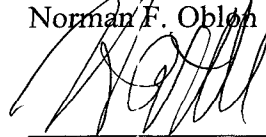
However, neither Falk et al nor Shah et al remedy the above-discussed deficiencies in the combination of Hofmann and either DeWitt, Takarabe et al and Morningstar et al.

For all the above reasons, it is respectfully requested that the rejections be withdrawn.

All of the presently pending and active claims in this application are now believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Respectfully submitted,

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